

Name: _____

Block: _____

Testing for Macromolecules

Introduction

One characteristic of life is that living things are made up of molecules containing carbon. When carbon combines into complex and large molecules, they are called organic molecules or macromolecules. In our class we have been referring to them as macromolecules and in the lab they are called organic molecules. The most common organic compounds found in living organisms are LIPIDS, CARBOHYDRATES, PROTEINS, and NUCLEIC ACIDS. Common foods, which often consist of plant materials or substances derived from animals, are also combinations of these organic compounds. Simple chemical tests with substances called indicators can be conducted to determine the presence of organic compounds. When an indicator changes colors this means a positive test for the presence of an organic compound.

In this lab we will use 4 reagents to indicate carbohydrates, proteins, and lipids (fat). The reagents that will be used are: Benedict's, iodine, Biuret, and Sudan IV.

Go to the website and <http://bit.ly/1oL8H0H>.

In this lab you will learn how to test for each of these organic molecules by clicking on the boxes below. Complete each of the tests for carbohydrates, proteins and fats as the prelab. When you have finished click on the foods button to conduct the lab and test for the presence of which organic compounds are found in various common foods.

Pre-Lab

Carbohydrates

What reagent reacts with simple sugars (like glucose)? _____

What color does the reagent turn when it reacts with glucose? _____

	Color	Indicates simple sugar (+ or -)
Heated Benedict's solution and water		
Benedict's solution and glucose		

What reagent reacts with complex sugars (like starch)? _____

	Color	Indicates simple sugar (+ or -)
Iodine and water		
Iodine and Starch		

Select [Organic Molecules](#) to return

Proteins

What reagent reacts with proteins)? _____

What color does the reagent turn? _____

	Color	Indicates simple sugar (+ or -)
Biuret and water		
Biuret and Protein		

Select [Organic Molecules](#) to return

Fats/Lipids

What reagent reacts with fats/lipids)? _____

What color does the reagent turn? _____

	Color	Indicates simple sugar (+ or -)
Sudan IV and Water		
Sudan IV and Fat		

Select [Organic Molecules](#)

Testing for Macromolecules ***Class Set

Next you will select the [Foods](#) tab to complete the lab below. Complete the lab write up on your own paper. You must clearly label each section and complete, but any notes or instructions you do not have to rewrite. ***Staple the pre-lab to the top of your lab write up.

Scientific Questions: What macromolecules are present in common foods?

Hypothesis: *Chose one food from the lab and write a hypothesis about which macromolecule are found in that food. Use If_____, then _____ because format.*

Materials:

- Potatoes
- Eggs
- Salmon
- Orange Juice
- Almond
- Milk
- Benedict's Solution
- Iodine
- Biuret Solution
- Sudan IV
- Test Tubes
- Test tube Rack
- Water
- Hot Plate

Procedure:

1. Select potatoes, and test for simple sugars, starch, proteins, and fat/lipids.
2. Record the color of each indicator in the data table and whether it is positive or negative for that macromolecule.
3. Repeat for the remaining food.

Data:

	Simple Sugar		Starch		Protein		Fat/Lipids	
	Benedict's		Iodine		Biuret		Sudan IV	
	Color	+ or -	Color	+ or -	Color	+ or -	Color	+ or -
Potatoes								
Orange Juice								
Almonds								
Eggs								
Salmon								
Milk								

Data Analysis:

1. What is an indicator?
2. In the pre-lab, we added each reagent to water. Why was this a necessary step necessary for a good lab?
3. Why did the lab not test for nucleic acids? How could you test for nucleic acids?

Conclusion:

Write a conclusion to answer the question: Which macromolecules are present in common foods?

You only have to write about the food you choose to write your hypothesis about. Use the Claim-Evidence-Reasoning format, and write a paragraph with complete sentences. See the rubric and sentence stems in your binder as a guide. Below is an example of a food you did not test today. You do not have to label each section, I did this to show what each section should contain.

Claim: Fats or Lipids was the only macromolecule present in vegetable oil.

Evidence: When oil was added to the Benedict's solution, the reagent stayed blue.

Reasoning: This indicates that oil is negative for simple sugars.

Evidence: When oil was added to Iodine, the reagent stayed orange.

Reasoning: This indicates that oil is negative for starch because there was no color change.

Evidence: When oil was added to Biuret solution, the reagent stayed blue.

Reasoning: This indicates that oil is negative for proteins because there was no color change.

Evidence: When oil was added to Sudan IV solution, the reagent turned orange.

Reasoning: This indicates that oil is positive for lipids because Sudan IV reacts with an oil and turns orange.